2015 HS3 Science Team Meeting

Ames Research Center, Moffett Field, CA

Meeting Close Out

Actions On Your Part

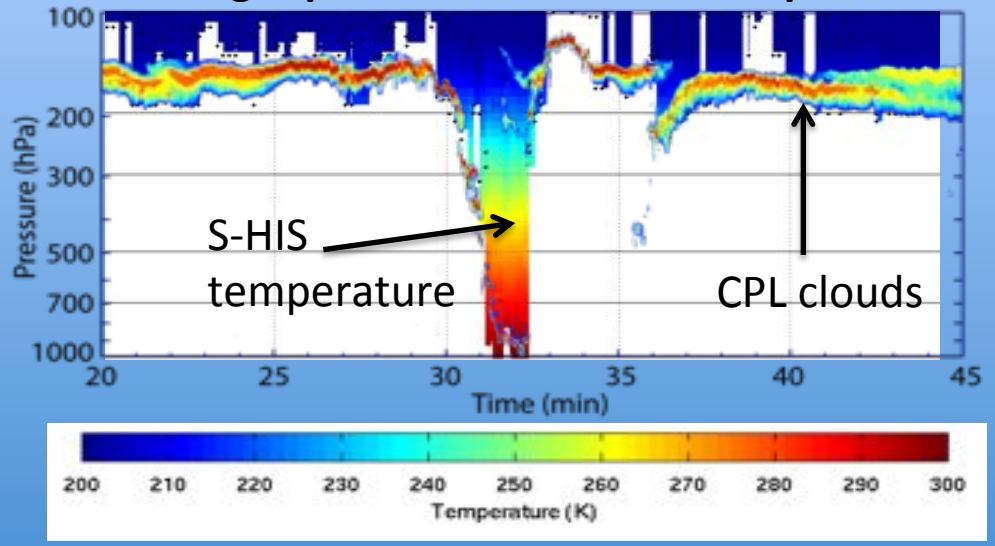
- Send me a list of planned publications
- Keep me updated on
  - When papers are submitted
  - When papers are accepted
- Send highlight slides (template to be provided) as papers are submitted

Hurricane and Severe Storm Sentinel

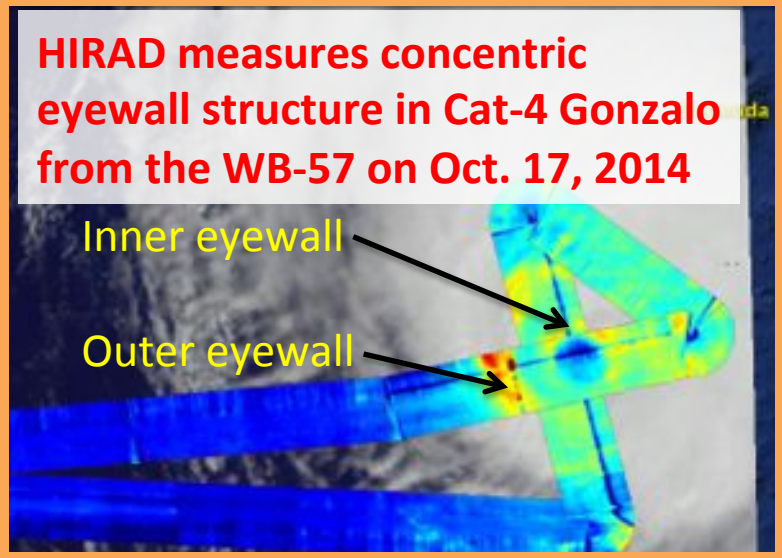
Scott Braun (Code 612) NASA/GSFC

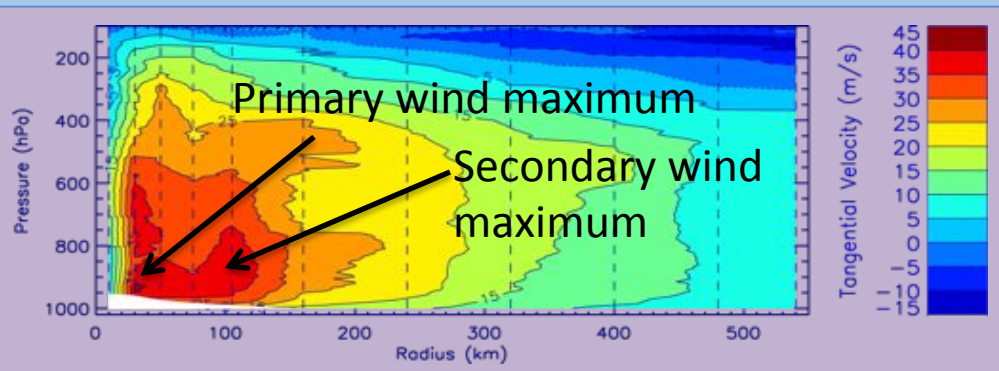
Using the NASA Global Hawk and WB-57, the HS3 mission successfully overflew four Atlantic tropical cyclones in 2014, including two major hurricanes (4 Global Hawk flights over Edouard, 3 WB-57 flights over Gonzalo)

CPL & S-HIS look into the eye of Edouard during rapid intensification on Sept. 14-15



HIRAD measures concentric eyewall structure in Cat-4 Gonzalo from the WB-57 on Oct. 17, 2014





Composite tangential winds on Sept. 16-17 show a developing secondary wind maximum during the formation of a concentric eyewall pattern

Name: Scott Braun, NASA/GSFC, Code 612
E-mail: scott.a.braun@nasa.gov
Phone: 301-614-6316

Data sources: Data from the HS3 2014 field campaign are shown and include information from the Cloud Physics Lidar (CPL), Scanning High-resolution Interferometer Sounder (S-HIS), dropsondes from the Airborne Vertical Atmospheric Profiling System (AVAPS), and the Hurricane Imaging Radiometer (HIRAD). Flights include Hurricane Cristobal (Aug. 26-27 and 28-29), Tropical Storm Dolly (Sept. 2-3), Invest A90L and the Saharan Air Layer (Sept. 5-6), Hurricane Edouard (Sept. 11-12, 14-15, 16-17, 18-19), and two NOAA flights in the Atlantic Main Development Region for tropical cyclones (Sept. 22-23, 28-29).

Technical Description of Figures:

Upper right: CPL and S-HIS data from Sept. 14-15 when Edouard was undergoing rapid intensification into a strong Cat-2 hurricane. CPL data show the cloud tops over the eyewall and outer rain regions, but a sharp drop in cloud heights during passage over the eye. A dropsonde released into the eye and lower eyewall found a surface pressure of 967 hPa and wind speed of 40 ms-1 (77 kt) suggesting that the minimum pressure in the center was probably closer to 960 hPa. The values were ~10 hPa and ~10 kt greater than measured 4 hours earlier by a NOAA P-3.

Lower right: Composite radial cross section of tangential wind from all 88 dropsondes during the flight of Sept. 16-17 when the storm was near maximum intensity. The strongest winds are in the eyewall near 30 km and a weaker secondary maximum is seen near 100 km. During this time and later, satellite imagery showed a clear secondary eyewall, forming concentric eyewall structures.

Lower left: HIRAD “excess” (above the modeled value) brightness temperatures for Hurricane Gonzalo on Sept. 17, showing a concentric eyewall pattern. These brightness temperatures will, in the months ahead, be converted into surface wind speed and rainfall.

Scientific significance, societal relevance, relation to future missions: The Global Hawk provides a valuable capability for mapping out large regions of the storm and its environment. Despite being a relatively quiet season, HS3 was able to take measurements in 4 named storm, including 2 major hurricanes. The Hurricane Edouard flights sampled the majority of Edouard’s life cycle, from initial tropical storm, through rapid intensification, and eventual rapid weakening. The Gonzalo flights with the WB-57 (the “over-storm” Global Hawk failed to make it to Wallops for a second year, forcing HS3 to move HIRAD and HIWRAP to the WB-57) provided HS3’s first good over-storm measurements for a hurricane and will provide valuable information on concentric eyewall structure. This work provides a significant set of observations for understanding how the large-scale environment (including Saharan air) impacts developing storms and can provide important information for the analysis of data in hurricanes from satellite data such as from TRMM, GPM, Aqua, CALIPSO, and NPP.

Special Issue

- I'm working on BAMS HS3 Summary
- Would like to have HS3 special issue
  - AMS (MWR?)
  - Other?

AMS Tropical Conference

- Send in abstracts
  - Be clear to be related to HS3 (using HS3 observations)
  - Prefer only HS3 related, not GRIP